

## CLAIMS

What is claimed is:

1. A combination camera and loudspeaker comprising:  
a lens for selectively capturing and manipulating an image; and  
5 a loudspeaker assembly disposed proximate the lens for projecting audible  
sounds, said loudspeaker assembly comprising:  
a speaker coil disposed around at least a portion of an outer perimeter  
of the lens; and  
a transparent diaphragm connected to the speaker coil and aligned  
10 with at least a portion of the lens.
2. The combination camera and loudspeaker of claim 1 further comprising a  
controller connected to the loudspeaker assembly for selectively controlling optical  
properties of the transparent diaphragm.  
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3. The combination camera and loudspeaker of claim 2 wherein the controller  
selectively moves the transparent diaphragm relative to the lens.
4. The combination camera and loudspeaker of claim 2 wherein the controller  
20 selectively modifies a radius of curvature of the transparent diaphragm.
5. The combination camera and loudspeaker of claim 1 wherein the transparent  
diaphragm comprises polyethylen naphthalate (PEN) or polyethylen  
terephthalate (PET) plastic.

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6. The combination camera and loudspeaker of claim 1 wherein the transparent diaphragm is constructed of a transparent material with a thickness comprising between 10  $\mu\text{m}$  and 50  $\mu\text{m}$ .
- 5 7. The combination camera and loudspeaker of claim 6 wherein the transparent diaphragm is constructed of a transparent material with a thickness comprising approximately 20  $\mu\text{m}$ .
8. The combination camera and loudspeaker of claim 1 wherein the combination  
10 camera and loudspeaker is disposed within a mobile device.
9. The combination camera and loudspeaker of claim 8 wherein the mobile device comprises a cellular telephone.

10. A method of manipulating an image with a camera assembly comprising a camera with a lens and a loudspeaker with a transparent diaphragm, the method comprising:

5 aligning the transparent diaphragm with at least a portion of the lens; and  
selectively controlling optical properties of the transparent diaphragm to  
manipulate the image.

11. The method of claim 10 wherein selectively controlling the optical properties of the transparent diaphragm comprises selectively moving the transparent  
10 diaphragm relative to the lens to manipulate the image.

12. The method of claim 10 wherein selectively controlling the optical properties of the transparent diaphragm comprises selectively modifying a radius of curvature of the transparent diaphragm to manipulate the image.

15 13. The method of claim 10 wherein aligning the transparent diaphragm with at least a portion of the lens comprises aligning a polyethylene naphthalate (PEN) plastic, polyethylene terephthalate (PET) plastic, or a piezo-electric material with at least a portion of the lens.

20 14. The method of claim 10 wherein selectively controlling optical properties of the transparent diaphragm comprises applying a predetermined control signal to the transparent diaphragm to manipulate the image.

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15. A camera assembly comprising:  
a lens for selectively manipulating an image;  
a loudspeaker comprising a transparent diaphragm aligned with at least a  
portion of the lens; and  
5 a controller for selectively controlling optical properties of the transparent  
diaphragm to enable the transparent diaphragm to further manipulate  
the image.
16. The camera assembly of claim 15 wherein the loudspeaker further comprises  
10 a speaker coil disposed around at least a portion of a perimeter of the lens and  
connected to the transparent diaphragm for generating audible signals to be  
projected by the transparent diaphragm.
17. The camera assembly of claim 15 wherein the controller selectively moves  
15 the transparent diaphragm relative to the lens to enable the transparent diaphragm to  
further manipulate the image.
18. The camera assembly of claim 15 wherein the controller selectively controls  
the optical properties of the transparent diaphragm by selectively modifying a radius  
20 of curvature of the transparent diaphragm.
19. The camera assembly of claim 15 wherein the transparent diaphragm is  
constructed of polyethylen naphthalate (PEN) plastic, polyethylen terephthalate  
(PET) plastic, or a piezo-electric material.

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20. The camera assembly of claim 15 wherein the transparent diaphragm is constructed of a transparent material with a thickness comprising between 10  $\mu\text{m}$  and 50  $\mu\text{m}$ .
- 5 21. The camera assembly of claim 20 wherein the transparent diaphragm is constructed of a transparent material with a thickness comprising approximately 20  $\mu\text{m}$ .
22. The camera assembly of claim 15 further comprising a protective panel  
10 disposed across at least a portion of the lens and the loudspeaker.
23. The camera assembly of claim 22 wherein the protective panel is constructed of a transparent material permanently disposed across at least a portion of the lens and the loudspeaker.
- 15 24. The camera assembly of claim 22 wherein the protective panel comprises a movable panel that covers at least a portion of the camera assembly in a first position and exposes at least a portion of the camera assembly in a second position.
- 20 25. The camera assembly of claim 24 wherein the protective panel comprises a rigid panel slidably connected to the camera assembly and movable between the first and second positions.
- 25 26. The camera assembly of claim 15 wherein the camera assembly is disposed within a mobile device.

27. The camera assembly of claim 26 wherein the mobile device comprises a cellular telephone.

28. A method of capturing an image with a camera comprising transmitting light through a transparent diaphragm of a speaker to an adjacent lens of the camera.

29. The method of claim 28 further comprising selectively controlling optical  
5 properties of the camera with a speaker controller.

30. The method of claim 29 wherein selectively controlling the optical properties of the camera comprises moving the transparent diaphragm relative to the lens by applying a control signal from the speaker controller to the speaker.

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31. The method of claim 29 wherein selectively controlling the optical properties of the camera comprises selectively modifying a radius of curvature of the transparent diaphragm by applying a control signal from the speaker controller to the speaker.

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32. The method of claim 28 wherein transmitting light through the transparent diaphragm of the speaker to the adjacent lens of the camera comprises transmitting light through polyethyelene naphthalate (PEN) plastic, polyethyelene terephthalate (PET) plastic, or a piezo-electric material.

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